Electrochemical Gas Sensors for Harsh Environments

This application note highlights SemeaTech electrochemical gas sensors that utilize ionic liquid electrolytes, ensuring reliable performance in harsh environments.

1. Ionic Liquid Electrolytes

Ionic liquids are salts that remain in liquid form at or near room temperature, composed entirely of positively and negatively charged ions. Unlike traditional electrolytes, ionic liquids are chemically stable, non-volatile, and exhibit negligible vapor pressure.

2. Advantages of Ionic Liquid Electrolytes

Ionic liquid electrolytes offer significant performance benefits compared to traditional electrolytes. As a result, they:

- Minimize environmental influences such as humidity and temperature fluctuations.
- Provide enhanced long-term stability and durability in harsh operating conditions.
- Reduce the risk of electrolyte leakage or evaporation.
- Improve sensor reliability and consistency across diverse applications.

These features make ionic liquid-based sensors particularly well-suited for demanding environments, including regions with high humidity and elevated temperatures.

3. List of SemeaTech Electrochemical Gas Sensors Utilizing Ionic Liquid Electrolyte

Gas	Product Name	Part Number	Detection Range	Resolution	Key Differentiators	Datasheet
Hydrogen Sulfide (H2S)	4H2S-100HT	052-2000-000	0 ~ 100 ppm	0.1 ppm	High-temperature reliability: operates up to 65 °C.	Open
	7H2S-100HT	052-2100-000	0 ~ 100 ppm	0.015 ppm		Open
Sulfur Dioxide (SO2)	4SO2-20B	056-1000-000	0 ~ 20 ppm	0.02 ppm	Excellent environmental robustness: maintains stable performance across a wide humidity range and extreme temperatures up to 60°C.	Open
	4SO2-20BF	056-0900-000	0 ~ 20 ppm	0.02 ppm		Open
	7SO2-20B	056-1200-000	0 ~ 20 ppm	0.01 ppm		Open
	7SO2-20BF	056-1100-000	0 ~ 20 ppm	0.01 ppm		Open
	mini SO2-20B	056-5000-000	0 ~ 20 ppm	0.03 ppm	High resolution. Ethanol-resistant.	Open
	mini SO2-20BF	056-5100-000	0 ~ 20 ppm	0.02 ppm		Open
Bromine (Br2)	4Br2-1	073-0000-000	0 ~ 1 ppm	0.01 ppm	High resolution. Inherently robust.	Open
	4Br2-10	073-0200-000	0 ~ 10 ppm	0.01 ppm		Open
	4Br2-100	073-0100-000	0 ~ 100 ppm	0.015 ppm		Open

Gas	Product Name	Part Number	Detection Range	Resolution	Key Differentiators	Datasheet
Ammonia (NH3)	4NH3-100L	059-1200-000	0 ~ 100 ppm	0.2 ppm	Long-life, resistant to harsh environments	Open
	4NH3-200L	059-2000-000	0 ~ 200 ppm	1 ppm		Open
	4NH3-500L	059-1100-000	0 ~ 500 ppm	2 ppm		Open
	4NH3-1000L	059-1300-000	0 ~ 1000 ppm	2 ppm		Open
	4NH3-5000L	059-1500-000	0 ~ 5000 ppm	0.5 ppm		Open
	7NH3-100L	059-1600-000	0 ~ 100 ppm	1 ppm		Open
	7NH3-200L	059-2700-000	0 ~ 200 ppm	1 ppm		Open
	7NH3-500L	059-1700-000	0 ~ 500 ppm	2 ppm		Open
	7NH3-1000L	059-3200-000	0 ~ 1000 ppm	2 ppm		Open
	mini NH3-100L	059-5100-001	0 ~ 100 ppm	0.08 ppm	Long-life, high resolution	Open
Hydrogen Cyanide (HCN)	4HCN-10S	064-1100-000	0 ~ 10 ppm	0.1 ppm	Low humidity interference, long-life	Open
	4HCN-50S	064-1000-000	0 ~ 50 ppm	0.2 ppm		Open
	7HCN-50S	064-1200-000	0 ~ 50 ppm	0.2 ppm		Open
	mini HCN-10S	064-5000-000	0 ~ 50 ppm	0.03 ppm	High resolution.	Open
Formaldehyde (CH2O)	4CH2O-10	072-0000-000	0 ~ 10 ppm	0.05 ppm	Unique electrochemical system for less cross interference.	Open
	4CH2O-50	072-0100-000	0 ~ 50 ppm	0.1 ppm		Open
	7CH2O-10	072-0200-000	0 ~ 10 ppm	0.05 ppm		Open
	7CH2O-50	072-0300-000	0 ~ 50 ppm	0.1 ppm		Open
Phosgene (COCL2)	4COCL2-1	077-0000-000	0 ~ 1 ppm	10 ppb	High resolution. Inherently robust.	Open
	4COCL2-3	077-0200-000	0 ~ 3 ppm	10 ppb		Open
Hydrazine (N2H4)	4N2H4-1	082-0000-000	0 ~ 1 ppm	0.002 ppm	High resolution. Inherently robust.	Open
Process Monitoring Sensors	4SM SO2-20	056-6000-000	0 ~ 20 ppm	0.01 ppm	Anti-alcohol interference, suitable for semiconductor industry process gas monitoring.	Open
	4SM CL2-5	062-6000-000	0 ~ 5 ppm	0.008 ppm		Open
	4SM HCL-10	063-6000-000	0 ~ 10 ppm	0.003 ppm		Open
	4SM HF-5	069-6000-000	0 ~ 5 ppm	0.2 ppm		Open